REMARKS

Applicant respectfully requests reconsideration and allowance of the claims in light of the foregoing amendments and following remarks.

Claims 1-27 remain pending in the present application. Claims 1 and 25 are independent.

Claims 1-27 are rejected. These rejections are respectfully traversed.

Claims 1, 3, 5, 6, and 25 are amended. No new matter is added.

Objection to the Drawings

The Office Action ("Action") objects to the drawings. Responsive to the Examiner's request, a designation of "PRIOR ART" is added to each of Figures 1-4 as illustrated in the replacement sheets filed herewith. Applicant submits that the replacement sheets comply with the requirements of 37 C.F.R. 1.121(d).

Accordingly, Applicant respectfully submits that the objection to the drawings should be withdrawn.

Objections to Claims 6, 9, and 10

The Action objects to dependent claim 6 because of a minor informality in the claim. Claim 6 is amended to recite "of Claim 1" rather than "of any one of Claims 1."

Accordingly, Applicant respectfully submits that the objections to dependent claim 6 should be withdrawn.

The Action objects to dependent claims 9 and 10, asserting that the two claims are redundant. However, Applicant respectfully submits that claim 9 recites "wherein the ***input output protocol processor*** is connected to at least one of the switching element" (emphasis added) and claim 10 recites "wherein the ***system control processor*** is connected to at least one of the switching element" (emphasis added). Therefore, because the claimed "input output protocol processor" is distinct from the claimed "system control processor," Applicant submits that dependent claims 9 and 10 are not redundant.

Accordingly, Applicant respectfully submits that the objections to dependent claims 9 and 10 should be withdrawn.

Patentability of Claims 1-27 under 35 U.S.C. § 112

The Action rejects claims 1-27 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. Specifically, the Examiner alleges that the

specification of the present application "does not describe converting input/output link protocols to an internal link protocol and vice versa." Applicant respectfully disagrees and directs the Examiner's attention to the present specification, for example, at page 9, lines 2-8, which states the following (with emphasis added):

> Fig. 5 shows two dimensional broken (or disconnected) mesh network 500 where ***the input/output protocol processor 510 converts the input/output link protocol to internal link protocol 540***. Unlike conventional mesh network 100 of Fig. 1, a basic switching element 520 does not have connection to the local traffic source or sink. All traffic sources and sinks 530 are connected on the boundary of the broken mesh network 500. Input and output protocol processors 510 connect the basic switching element 520 and traffic source and link 530.

Accordingly, Applicant respectfully submits that the 35 U.S.C. § 112, first paragraph rejections of claims 1-27 should be withdrawn.

The Action rejects claims 1-27 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicant regards as the invention. Specifically, the Examiner asserts that the terms "input/output link protocol" and "internal link protocol" are not clear. Applicant respectfully disagrees and directs the Examiner's attention to the present specification, for example, at page 4, lines 1-11, which states the following (with emphasis added):

> Figure 3 shows a 8x8 Omega switching network 300. ***The input link 341 and output link 342 have a different protocol from the internal link 343.*** Generally the input packets are reformatted to have internal header information for self-routing in the input protocol processor 310 and output protocol processor 320. The internal switching network 350, so called fabric, has all same protocol connections 343. ***There are two times protocol conversions in the switching system 300; one from input link 341 to internal link 343 and the other from internal link 343 to output link 342.*** These conversions happen in the input protocol processor 310 and output protocol processor 320. These protocol processors 310 and 320 decouple one side protocol from the other side protocol. In the figure 3, if a connection becomes faulty, then some traffic will be lost because there is only one path to one source and destination pair, so it is not fault tolerant.

Accordingly, Applicant respectfully submits that the 35 U.S.C. § 112, second paragraph rejections of claims 1-27 should be withdrawn.

In addition, the Examiner asserts that claims 1-24 "are indefinite because it is not clear what is meant by the phrases 'broken mesh network' and 'monotone increasing way increment by 1.'" Regarding the term "broken mesh network," Applicant respectfully disagrees and again directs the Examiner's attention to the present specification, for example, at page 9, lines 2-8, which states the following (with emphasis added):

> Fig. 5 shows two dimensional broken (or disconnected) mesh network 500 where the input/output protocol processor 510 converts the input/output link protocol to internal link protocol 540. ***Unlike conventional mesh network 100 of Fig. 1, a basic switching element 520 does not have connection to the local traffic source or sink.*** All traffic sources and sinks 530 are connected on the boundary of the broken mesh network 500. ***Input and output protocol processors 510 connect the basic switching element 520 and traffic source and link 530.***

Regarding the term "monotone increasing way increment by 1," Applicant submits that claims 1, 3, 5, and 6 are amended to recite the following: "the coordinates are numbered increasingly by increment 1."

Accordingly, Applicant respectfully submits that the 35 U.S.C. § 112 rejections of claims 1-27 should be withdrawn.

The Examiner also asserts that dependent claims 9-12 and 23-24 "are indefinite because it is not clear what is meant by the term 'broken' since the two elements are still interconnected." However, as discussed above, the term "broken" refers to the fact that "[u]nlike conventional mesh network 100 of Fig. 1, a basic switching element 520 does not have connection to the local traffic source or sink" (*see* present application at page 9, lines 4-5). That is, for example, the horizontal loops 150 and vertical loops 160 of Fig. 1 are said to be "broken" because, instead of such horizontal and vertical loops, "[i]nput and output protocol processors 510 connect the basic switching element 520 and traffic source and link 530" (*see* present application at page 9, lines 6-8).

Accordingly, Applicant respectfully submits that the 35 U.S.C. § 112 rejections of dependent claims 9-12 and 23-24 should be withdrawn.

Claims 1-21 and 23-26 are Patentable over Thorson, Passint, and APA under 35 U.S.C. § 103(a)

The Action rejects claims 1-21 and 23-26 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,553,198 to Thorson ("Thorson") in view of U.S. Patent No. 6,230,252 to Passint et al. ("Passint") in view of Admitted Prior Art ("APA"). Applicant respectfully traverses these rejections.

Claims 1-21 and 23-24

Independent claim 1 as amended is directed to an n-dimensional broken mesh network, and recites the following:

> broken links generated by breaking connections between a starting switching element of each dimension and an ending switching element of each dimension;

input output protocol processing block connected to the broken links, wherein input output protocol processing blocks convert an input/output link protocol to an internal link protocol; and

external traffic links connected to the input output protocol processing blocks, wherein each switching element is identified by n-tuple coordinates, (d1, d2, ..., dn), and there are connections between two switching elements having n-1 same coordinates and the other coordinate is different only plus minus one, ±1, when the coordinates are numbered increasingly by increment 1.

Applicant respectfully submits that Thorson does not teach or suggest an "n-dimensional broken mesh network," as recited in independent claim 1. For example, each node 12.xx in FIG. 1 of Thorson includes a processing element (*see, e.g.,* col. 4, line 59, to col. 5, line 2, as noted in the Action). In contrast, embodiments of the present application involve processing elements (e.g., input output protocol processors 510 of Fig. 5) that are separate (e.g., external) from the switching elements (e.g., switching elements 520 of Fig. 5). Thus, in embodiments of the present application, and unlike a Thorson network, there are no direct connections between switching elements (e.g., switching elements 520 of Fig. 5) and local traffic sources or sinks (e.g., traffic sources and sinks 530 of Fig. 5).

Applicant respectfully offers an analogy to assist the Examiner in understanding the fundamental differences between Thorson and embodiments of the present application. A Thorson network can be thought of as a highway system that allows on-ramps and off-ramps (connections to sources or sinks) at every intersection (switching element). In contrast, a network in accordance with the present application can be thought of as a well-designed highway that advantageously does not provide on-ramps and off-ramps (connections to sources or sinks) at every intersection (switching element).

Furthermore, Thorson does not teach or suggest at least "broken links generated by breaking connections between a starting switching element of each dimension and an ending switching element of each dimension," as recited in independent claim 1. For example, Applicant can find nothing in Thorson that teaches or suggests breaking connections between starting and ending switching elements.

Also, because Thorson does not teach or suggest breaking connections between starting and ending switching elements, Thorson does not and cannot teach or suggest at least "input output protocol processing block connected to the broken links," as recited in independent claim 1." Because Thorson does not teach or suggest such an input output processing block, Thorson does not and cannot teach or suggest an "input output protocol processing block connected to the broken links, wherein input output protocol processing

blocks convert an input/output link protocol to an internal link protocol," as recited in independent claim 1.

In addition, Thorson does not teach or suggest at least "external traffic links" that are "connected to the input output protocol processing blocks" and "wherein each switching element is identified by n-tuple coordinates, (d1, d2, ..., dn), and there are connections between two switching elements having n-1 same coordinates and the other coordinate is different only plus minus one, ±1, when the coordinates are numbered increasingly by increment 1," as acknowledged by the Action at pages 4-5.

Passint fails to cure the deficiencies of Thorson. For example, Passint does not teach or suggest at least "broken links generated by breaking connections between a starting switching element of each dimension and an ending switching element of each dimension," as recited in independent claim 1. For example, Applicant can find nothing in Passint that teaches or suggests breaking connections between starting and ending switching elements.

Furthermore, because Passint does not teach or suggest breaking connections between starting and ending switching elements, Passint does not and cannot teach or suggest at least "input output protocol processing block connected to the broken links," as recited in independent claim 1."

Additionally, even if one were to equate the router chips 50 of Passint with the claimed switching elements (for sake of argument only), Passint would still fail to teach or suggest at least an "input output protocol processing block connected to the broken links, wherein input output protocol processing blocks convert an input/output link protocol to an internal link protocol," as recited in independent claim 1. For example, Applicant can find nothing in Passint that teaches or suggests converting an input/output link protocol to an internal link protocol.

In addition, Passint does not teach or suggest at least "external traffic links" that are "connected to the input output protocol processing blocks" and "wherein each switching element is identified by n-tuple coordinates, (d1, d2, ..., dn), and there are connections between two switching elements having n-1 same coordinates and the other coordinate is different only plus minus one, ±1, when the coordinates are numbered increasingly by increment 1," as recited in independent claim 1.

APA fails to cure the deficiencies of Thorson and Passint because APA fails to teach or suggest at least "broken links generated by breaking connections between a starting switching element of each dimension and an ending switching element of each dimension"

and "external traffic links connected to the input output protocol processing blocks," as recited in independent claim 1.

APA also fails to teach or suggest at least "input output protocol processing block connected to the broken links, wherein input output protocol processing blocks convert an input/output link protocol to an internal link protocol," as recited in independent claim 1. The Action states at page 5 that "[t]he APA discloses a switching network that makes use of protocol conversion to transport information **[0014]**." It appears that the Action is specifically focusing on the 8x8 Omega switching network 300 illustrated in Fig. 3 of the present application. However, the switching network 300 does not have broken links between starting and ending switching elements, let alone an input output protocol processing block connected to the broken links. Because the switching network 300 does not have such an input output protocol processing block, the switching network 300 does not and cannot have an input output protocol processing block that can "convert an input/output link protocol to an internal link protocol."

Applicant respectfully submits that, because Thorson, Passint, and APA, taken individually or in combination with each other, all fail to teach or suggest each and every feature recited in independent claim 1, the 35 U.S.C. § 103(a) rejection of independent claim 1 should be withdrawn.

Furthermore, MPEP § 2143 states that "the key to supporting any rejection under 35 U.S.C 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious" and sets forth the seven "Exemplary Rationales" as provided by the *Examination Guidelines for Determining Obviousness under 35 USC 103 in View of the Supreme Court Decision in KSR International Co. v. Teleflex Inc.* (Federal Register, Vol. 72, No. 195, p. 57526).

Based on the language in the Action, it appears that the Examiner is relying upon rationale G ("Some teaching, suggestion, or motivation . . . to modify the prior art reference or to combine prior art reference teachings"). In order to support a conclusion of obviousness under this rationale, the Examiner ***must articulate*** the following:

> (1) a finding that there was some teaching, suggestion, or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings;
>
> (2) a finding that there was reasonable expectation of success; and
>
> (3) whatever additional findings based on the Graham factual

> inquiries may be necessary, in view of the facts of the case under consideration, to explain a conclusion of obviousness.

The Examiner asserts that the suggestion to combine Thorson and Passint is "to provide a scalable system." However, one of ordinary skill in the art would readily recognize that a Thorson network is already scalable, at least to some degree. For example, Thorson describes "[a] method of routing messages within an n-dimensional network topology" (*see* Abstract). Thus, because a Thorson network is already Scalable, Applicant submits that one having ordinary skill in the art would not be motivated to pursue the proposed combination "to provide a scalable system." Also, it appears that a Passint network may be no more scalable than a Thorson network anyway. In fact, a Passint network could very well be less scalable than a Thorson network due to the apparently increased complexity of a Passint network. Therefore, one of ordinary skill in the art would not be motivated to pursue, and might actually be discouraged from pursuing, the proposed combination of Thorson and Passint.

Furthermore, even if one were to pursue the proposed combination, the Examiner has not provided a finding that there would be a reasonable expectation of success. In fact, the structural differences between Thorson (e.g., processing performed within the nodes) and Passint (e.g., processing performed outside of the nodes) could actually render the combination unsatisfactory for its intended purpose, thereby discouraging one of ordinary skill in the art from pursuing the proposed combination.

The Examiner asserts that the suggestion to combine Thorson and APA is "to find a processing unit from any location in the mesh" and "to provide self-routing functionality." However, Applicant submits that Thorson already appears to have such features. For example, Thorson describes an approach using a lookup table that "permits remapping of node locations in order to select alternate travel paths or to logically replace a failed node with a spare node at a different network location" (*see* col. 8, lines 58-61). Therefore, Applicant submits that one having ordinary skill in the art would not be motivated to pursue the proposed combination of Thorson and APA for the reasons provided by the Examiner. Even if one were to pursue the proposed combination, the Examiner has not provided a finding that there would be a reasonable expectation of success.

Because a proper *prima facie* case of obviousness has not been established for at least the foregoing reasons, the 35 U.S.C. § 103(a) rejections of independent claim 1 should be withdrawn.

Alternatively, even if the Action is relying on rationale A ("Combining prior art elements according to known methods to yield predictable results"), the rejection is still improper. The Examiner is reminded that, in order to reject a claim based on this rationale, he or she ***must articulate*** the following:

> (1) a finding that the prior art included each element claimed, although not necessarily in a single prior art reference, with the only difference between the claimed invention and the prior art being the lack of actual combination of the elements in a single prior art reference;
>
> (2) a finding that one of ordinary skill in the art could have combined the elements as claimed by known methods, and that in combination, each element merely performs the same function as it does separately;
>
> (3) a finding that one of ordinary skill in the art would have recognized that the results of the combination were predictable; and
>
> (4) whatever additional findings based on the *Graham* factual inquiries may be necessary, in view of the facts of the case under consideration, to explain a conclusion of obviousness.

The Examiner does not provide a finding that Thorson, Passing, and APA include each element claimed. In fact, the references do not include each element recited in independent claim 1, as discussed in detail above. Thus, any assertion that the cited prior art includes each element recited in the claims cannot be made. As a result, the rationale outlined in the Action cannot be used to support a conclusion that independent claim 1 would have been obvious to one of ordinary skill in the art.

Furthermore, the Examiner does not provide a finding that, in the proposed combination, each element merely performs the same function as it does separately. Additionally, the Examiner does not provide a finding that one of ordinary skill in the art would have recognized that the results of the combination were predictable.

Again, because a proper *prima facie* case of obviousness has not been established, the 35 U.S.C. § 103(a) rejection of independent claim 1 should be withdrawn.

Dependent claims 2-21 and 23-24 depend from independent claim 1 and are allowable for at least the reasons presented above with respect to the parent claim 1. Dependent claims 2-21 and 23-24 are also independently patentable. Therefore, the 35 U.S.C. § 103(a) rejections of dependent claims 2-21 and 23-24 should be withdrawn.

Furthermore, with regard to dependent claim 2, the Action directs attention to FIG. 5 of Thorson and asserts that "Thorson discloses a processing element that is made up of one or more processors." Claim 2 recites system control processors connected to the broken links. However, Thorson does not teach the broken links recited in the claims, as discussed above. The rejection itself does not appear to refute this as it fails to mention the broken links at all;

rather, it merely makes a general statement that appears to have no direct bearing on the claim. Applicant can find nothing in Thorson that teaches or suggests an n-dimensional broken mesh network "further comprising system control processors connected to the broken links," as recited in dependent claim 2. Therefore, the 35 U.S.C. § 103(a) rejection of dependent claim 2 should be withdrawn for at least these additional reasons.

Additionally, the Action fails to articulate any reasoning to support a legal conclusion that it would have been obvious to combine the references in a manner that arrives at the elements recited in dependent claim 2. In view of the fact that Thorson, Passint, and APA fail to teach or suggest each and every element of the parent claim 1, and absent any clear articulation of the reason(s) *why* dependent claim 2 would have been obvious in light of the proposed combination, the Action thus fails to establish a *prima facie* case of obviousness with respect to dependent claim 2.

Claims 25 and 26

Independent claim 25 as amended is directed to a switching system, and recites the following:

> a broken mesh network comprising:
> n-dimensionally arranged frames; and
> n-dimensional unit cells defined by n-tuple frames of each dimension; and
> switching boards mounted in unit cell, wherein a protocol processing block is connected to the switching boards mounted in unit cells located at outer surface or located interior remote from the outer surface are connected to a input output protocol processing block, and an outer traffic link is connected to the input output processing block, and wherein the protocol processing block converts an input/output link protocol to an internal link protocol.

As discussed above, Thorson does not teach or suggest a broken mesh network as recited in the claims. Therefore, Thorson does not teach or suggest at least "a broken mesh network comprising: n-dimensionally arranged frames; and n-dimensional unit cells defined by n-tuple frames of each dimension," as recited in independent claim 25.

Passint and APA both fail to cure the deficiencies of Thorson because Passint and APA also fail to teach or suggest a broken mesh network as recited in the claims, let alone "broken mesh network comprising: n-dimensionally arranged frames; and n-dimensional unit cells defined by n-tuple frames of each dimension," as recited in independent claim 25.

Therefore, Applicant respectfully submits that Thorson, Passint, and APA, taken individually or in combination with each other, all fail to teach or suggest each and every feature recited in independent claim 25.

Furthermore, as discussed above, a proper *prima facie* case of obviousness has not been established.

Accordingly, the 35 U.S.C. § 103(a) rejection of independent claim 25 should be withdrawn.

Dependent claim 26 depends from independent claim 25 and is allowable for at least the reasons presented above with respect to the parent claim 25. Dependent claim 26 is also independently patentable. Therefore, the 35 U.S.C. § 103(a) rejection of dependent claim 26 should be withdrawn.

Claims 22 and 27 are Patentable over Thorson, Passint, APA, and Brock under 35 U.S.C. § 103(a)

The Action rejects dependent claims 22 and 27 under 35 U.S.C. § 103(a) as being unpatentable over Thorson in view of Passint and APA, and further in view of U.S. Patent No. 6,836,849 to Brock et al. ("Brock"). Applicant respectfully traverses these rejections.

Dependent claim 22 depends from independent claim 1 and is allowable for at least the reasons presented above with respect to the parent claim 1. Dependent claim 22 is also independently patentable. Therefore, the 35 U.S.C. § 103(a) rejection of dependent claim 22 should be withdrawn.

Dependent claim 27 depends from independent claim 25 and is allowable for at least the reasons presented above with respect to the parent claim 25. Dependent claim 27 is also independently patentable. Therefore, the 35 U.S.C. § 103(a) rejection of dependent claim 27 should be withdrawn.

Conclusion

Applicant submits that the present application is in condition for allowance and such action is respectfully requested.

The Examiner is encouraged to telephone the undersigned at (503) 222-3613 if it appears that an interview would be helpful in advancing the case.

Respectfully submitted,

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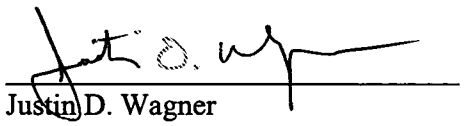

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